

Career and Technical Education
Promising Practices Initiative

Sponsored by the Maine Department of Education,
Division of Career and Technical Education,
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Featured Promising Practice:
Career Academies

Maine CTE Center
working with this *Promising Practice*:
Lewiston Regional Technical Center

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Promising Practices descriptions and mini-case studies developed by
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PROMISING PRACTICE: CAREER ACADEMIES

Description

Students select an integrated program of academic and CTE courses that focuses on preparation for a specific career area. Coursework includes community-based learning experiences, alignment of academic learning standards, and expectations to achieve rigor and relevance in student learning.

Why Is This a *Promising Practice*?

There is a growing consensus in the business community that today's employers want workers to use initiative and solve problems, skills previously associated with employees who had been to college and had a good academic foundation in subjects like statistics. Plank (2001)¹ suggested that an integrated curriculum provides students with a strong academic program and a foundation in work applications so they can pursue a variety of levels and combinations of work and college. Zinser and Poledink (2005)² claim that "such a program may also offer other motivational benefits like greater relevance of academics, working harder in academics, and more commitment to school in general."

According to Edling and Loring (1996)³, a major objective of education should be to keep open a range of options for students, not to force a false choice between skills for work or academics for college. Zinser and Poledink make a strong case for the idea of integrated pre-professional *programs* (i.e., courses of study) beyond the insertion of academics into specific applied courses. "Even though there is a well-developed body of knowledge for core academic subjects—and it seems to make sense to teach them in isolation—the reality of modern life emphasizes context, relationships, and wholes, which is best exemplified by occupations. So teaching academics in the context of a profession such as engineering provides a framework for higher, reflective learning which includes analysis, synthesis, and systems thinking; and teaching engineering using a foundation of academics and process skills helps students grasp and apply the concepts from both areas" (Zinser & Poledink, 2005)⁴.

Establishing a career academy allows educators to take the best of academic and CTE programming and develop a thoughtful, high quality sequence of experiences that will truly prepare students for a wide range of career and educational options related to a field of interest.

¹ Plank, S. (2001). *Career and technical education in the balance: An analysis of high school persistence, academic achievement, and postsecondary destinations*. St. Paul, MN: National Research Center for Career and Technical Education, University of Minnesota.

² Zinser, R., & Poledink, P. (2005). The Ford Partnership for Advanced Studies: A New Case for Curriculum Integration in Technology Education, *Journal of Technology Education*, Vol. 17, No. 1. Accessed July 26, 2006 at <http://scholar.lib.vt.edu/ejournals/JTE/v17n1/zinser.html#plank#plank>.

³ Edling, W. H., & Loring, R. M. (1996). *Education and work: Designing integrated curricula. Strategies for integrating academic, occupational, and employability standards*. Waco, TX: Center for Occupational Research and Development.

⁴ Zinser, R., & Poledink, P. (2005). The Ford Partnership for Advanced Studies: A New Case for Curriculum Integration in Technology Education, *Journal of Technology Education*, Vol. 17, No. 1. Accessed July 26, 2006 at <http://scholar.lib.vt.edu/ejournals/JTE/v17n1/zinser.html#plank#plank>.

What Does It Look Like in Maine?

The mini-case study below describes how one Maine CTE center has developed two career academy programs in cooperation with its primary sending high school. Students in 10th, 11th, and 12th grade participated in the career academies. The program admitted its third 10th grade cohort and will generate its first graduates in the 2006–07 school year.

Promising Practice in Action: *Career Academies*

Lewiston Regional Technical Center (LRTC)⁵

Lewiston, ME

Dr. Don Canaan, Director

- **Location:** Attached to Lewiston High School
- **Student population:** 800+
- **Sending schools/districts:** 6
- ▶ **Program focus:** Two career academies—the School of Engineering Technology and the School of Health Sciences—staffed collaboratively with Lewiston High School and located at LRTC.

LRTC's mission statement reads, in part, that the staff "is committed to preparing students to be lifelong learners and providing them with educational opportunities and choices. Guided by Maine's Learning Results, we hold high performance expectations for ALL students." The description of each program area in the course catalog includes a list of the vocational aptitudes and competencies, academic pre-requisites, and literacy and math skills students will need to be successful. The program descriptions also provide the lexile score of the average materials students will be reading in each program. A high level of engagement and *application* of skills is just as important. "Working in partnership with our local businesses and industries, LRTC provides an excellent array of opportunities for internships, apprenticeships, cooperative education venues, and community-based training sites. This active engagement, together with a challenging academic program, is critical to the educational success for the 21st century" (LRTC Web site). Having high collective expectations, providing 27 program options, and focusing on achieving a common vision seems to have paid off: according to the school's five-year follow-up data, over 50% of graduates earned their college degrees and more than 70% were working in an area related to their LRTC program.

Dr. Don Canaan, LRTC director, is enthusiastic about everything the school has to offer. But when he discussed LRTC's newest program offerings—two career academies—the School of Engineering Technology and the School of Health Sciences—his eyes lit up. Designed to fuse rigor and relevance, the curriculum for each was carefully planned to prepare students for the college and workplace demands of the technology, engineering, and health sciences fields. Launched during the 2004–05 school year, both schools will produce their first graduates in 2007.

Common Design Elements of Both Career Academies

"Best practice" design elements common to both schools include:

- Groups of students work together with the same team of teachers for three years in a highly supportive, high achieving environment.
- The curriculum design organizes instruction around health and science themes or engineering topics.
- Programs support the requirements for college entrance while allowing students to acquiring practical, work-related knowledge and skills.
- There is a collaborative effort in partnership with post-secondary education, local industry, and with community programs.

⁵ The mini-case study is based on multiple conversations with LRTC staff and students, an onsite visit in May 2006, and extensive document review.

- Programs aim to be comprehensive learning experiences that will have “rigor, relevance, and relationships to learning” (Tony Wagner).
- Instruction is based on research of “best practices”.
- Advanced Placement courses are offered free of charge.

The School of Engineering Technology

The School of Engineering Technology, in partnership with the National Alliance for Pre-Engineering Programs, offers a rigorous curriculum modeled after “Project Lead the Way” (PLTW), a national pre-engineering curriculum. “The curriculum uses project-based, hands-on experiences to teach students the key elements and skills of engineering and technology-based careers by immersing them in real-world engineering problems” (PLTW brochure). The purpose of the school is to prepare students for “engineering and engineering technology careers requiring post-secondary education at a college, university, community college, or technical school.” LRTC’s program design included input from engineering consultants and advisors from both industry and higher education.

Students in the three-year sequence of courses take a full academic load at Lewiston High School with an emphasis on science and core CTE courses at LRTC: introduction to principles of technology; pre-engineering courses, such as digital electronics and DC power; computer-integrated manufacturing, automation, and materials handling; and complete an internship. Admission is by application and there is competition for the 30 slots available for each entering sophomore cohort.

The School of Health Sciences

The purpose of the School of Health Sciences is to prepare students for health careers requiring post-secondary education at a college, university, community college, or technical school. “Advantages of the School of Health Sciences include rigorous preparation for college, relating core academics to health care/science topics and integrated ‘hands-on’ learning experiences that enable students to preview their chosen career” (program brochure).

Promotional materials for the school note the present and anticipated shortages in the health care field and emphasize the variety of career paths available including internal medicine, physical therapy, nursing, dental medicine, radiology, and veterinary medicine. As in the engineering school, students take a rigorous set of prescribed academic courses with a science emphasis and core CTE courses including: an introduction to anatomy and physiology; a sequence of applied health sciences courses; and complete a practicum. Admission is by application and there is competition for the 21 slots available for each entering sophomore cohort.

What It Looks Like

One day in May 2006 in the School of Engineering Technology

- Six students sat behind computers in the CAD classroom working on individual design projects. One student was designing a play structure with a waffle design and a castle, another was working on an IPOD holder for the dashboard of a car. The instructor explained that everyone already completed the assignment to design a desktop organizer using a full design protocol—research of existing designs, drafting of three or four ideas, completion of matrix to decide on which design to choose, commitment to a design, reflection on the design process.
- Four students were working together on a manufacturing project on the programmable CMC milling machine. There was a problem with the quality control on the embossing of a

stamping block. The pneumatic vise closed and the drill began to emboss the block. The problem was that the students wanted to automate the process but they had no way to open the door. A second problem was the size of the block. The four-student team had two first-year and two second-year students. One student lifted the cover and checked the block. "Should we use a smaller block? Or should we use a regular block and just not use the helper? That's what I did last time." "Okay, you want to download that for me?"

- Fifteen students were working on computers in one-half of the large hydraulics lab. Motorized cars were running around the concrete floor. All of the computers were hooked up so the students could control motors, pistons, lights, and buzzers. Students talked with one another about the projects. The instructor shared her thoughts on teaching and learning: "If I tell them, they won't remember. If it is really hard and they figure it out, they'll remember. They learn from each other all the time. One kid figures something out and shows it to others. I learn things from them all the time...I spend less than a fifth of my time lecturing—the rest of the time I am reinforcing, providing resources and feedback." The Honor Society inducted new members that day, so many students were dressed formally. When the announcement was made to come to the meeting room, about a third of the students in the room left.
- In the second year pre-engineering design class, nine students worked on more sophisticated projects using Inventor, a software program that allows them to draw each view of their 3-D design. Two students worked on a toy train set, another pair on a bowling game and pins. One senior worked on the design for a skateboard park. Another designed a ratchet set. The atmosphere in the room was casual but focused. The instructor knew each student and his/her work.

What Students Said

Students in the School of Engineering Technology:

"I want to be an engineer so this gets me into it. It's not just lecture/talking but there's lots of hands-on." ... "Civil engineering was my favorite because we got to make a model and got to talk to real engineers who actually make stuff like that."... "Once you build it, you can get it to work using the computer"... "I'll stay in the program if it fits my schedule. I hope it does. My goal is to be some kind of engineer."... "Next time I am going to figure it out first before I start designing!"

Students in the School of Health Sciences:

"I think the program gives you a foot in the door, gives you an upper hand when you apply to college or for whatever career you want"... "I had an idea that I would like this but now I have a set plan for the future. I am going to UNE and I'll get my master's and then become a PA [physician's assistant]"... "I think it's a good idea. Maybe you find out what you don't want to do. I switched from PA to pharmacist." ... "[This class] is easier than most classes because I am interested in it. It's more hands-on—I like it better than most of my classes."... "It's great to have the same teacher. You can develop a really good relationship."... "You have to want to be here. You have to be ready to work and to focus. You have to be able to get along with people and you have to be able to work independently and use free time to do the work and learn on your own."

Literacy Integration

Students at the School of Health Sciences talked at length about the difficulty they were having with some of the academic literacy demands of the program—and these were top students! They spoke about the difficulty of writing the "systems page," a 5–15 page paper on a body system. As part of their coursework, students were expected to read the textbook, articles related to current events and health, and non-fiction books on relevant topics, for example,

Death and Dying. When asked how the program could better prepare them, the comments were not about content or opportunities to do hands-on—according to the students, those aspects of the program are in good shape. Instead, several of the challenges mentioned by the students were literacy related. Students spoke about the need *“to be able to learn things on your own because the college professors won’t ‘spoon feed;’”* and expressed concern about college writing—*“grammar, quotations, integrating other people’s views into your own writing.”* Students listed other concerns related to reading, and note taking: *“being able to read more quickly and to stay focused when reading; how to take better notes”*—*“I write too much or too little; I need to know how to pick out the important details.”*

Don Canaan held that the literacy piece is critical. He noted the large number of high school students who enter 9th grade but do not graduate, and he believes weak literacy skills play a big role. He acknowledged that many teachers do not have many strategies to help students develop their literacy skills—on the academic or the CTE side.

Other Supports

LRTC has published the lexile scores of the reading materials in each program area. Beginning in the 2006–07 school year, students in the Health Sciences and Engineering Technology programs will largely share the same English and science teachers, and the classes in these academic areas will be more closely aligned with the CTE side of the curriculum. Students in the two schools have the same guidance counselor for all three years—the student services coordinator is also certified in guidance and provides coherence and communication among all parties—parents, Lewiston High School, students, and LRTC. Teachers in the two schools are highly knowledgeable, both in their content areas and in instruction, and have participated in professional development and additional coursework.

Next Steps

- Find more ways to increase the coherence between the CTE and academic sides of the program.
- Provide professional development to teachers on literacy strategies they can use to support literacy development within the two schools.
- Increase opportunities to work on reading, writing, and presenting within the context of each CTE program area.
- Improve access to the schools for students from other high schools besides Lewiston.
- Develop a systemic set of criteria to measure program progress and success.
- Improve credit articulation agreements with sending districts/schools.

For more information, contact Dr. Don Canaan, LRTC Director.